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PATENT APPLICATION
Docket No. 15436.441.3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of		)
	Bo Su Chen et al.	)
Serial No.:	10/612,660	) Art Unit 2874
Filed:	July 2, 2003	)
For:	A LENS OPTICAL COUPLER	)
Confirmation No.:	5518	)
Customer No.:	022913	)
Examiner:	Michelle R. Connelly Cushwa	)

PRE-APPEAL BRIEF REQUEST FOR REVIEW

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

ARGUMENTS

Reconsideration of the application by a panel of examiners is respectfully requested in view of the following remarks. Please note that the following remarks are not intended to be an exhaustive enumeration of the distinctions between any cited references and the claimed invention. Rather, the distinctions identified and discussed below are presented solely by way of example to illustrate some of the clear errors and omissions needed for a prima facie rejection.

The Applicants respectfully cite to clear error as the Examiner has (1) unreasonably misconstrued a "spherical lens" as the claimed "aspherical lens", (2) has failed to provide concrete evidence of motivation, and (3) has not performed the required analysis for the claimed 112-6 means-plus-function elements.

The Examiner rejects claims 1, 17, 18, 21-24, 26-28, and 32 under 35 U.S.C. 102(e) as being anticipated by *Blasingame et al* (US 2004/0247242 A1). On page 12 of the Office Action the Examiner sets forth the following:

> Aspheric lenses are lenses that have one aspheric surface. A half-ball lens has a flat surface that is aspheric. For reference only, page 6.34 of the Melles Griot catalog is attached to this Office Action. As can be seen from the description of aspherical condenser lenses on this page, a lens having a spherical side surface and a plano back surface (pictured in the middle at the bottom of the page) is an aspheric lens. A half-ball lens has a spherical side surface and a plano back surface. Furthermore, Figure 3 of the present application illustrates an aspherical lens having a curved surface that forms a portion of a sphere, which appears to be in direct contrast to applicants statement that a spherical lens is a lens whose surfaces form portions of spheres.

The Examiner does not, however, cite to concrete evidence for the Examiner's definition of "aspheric" nor does the Examiner appear to understand the meaning of the term "aspherical" as it is understood by one of ordinary skill in the art. In the portion of the Melles Griot catalog cited to by the examiner, it is the curved portion on the left side of the plano back lens that designates the lens as an aspheric lens, <u>not</u> the plano portion on the right of the plano back lens. In fact, in the concave back and convex back lenses, the Melles Griot catalog clearly differentiates the difference between the aspheric left side of the lenses and the spherical right sides of the lenses.

An aspheric surface is a "lens surface which departs to a greater or lesser degree from a sphere, e.g. one having a parabolic or elliptical section."[1] Attached hereto is page 216 of Elements of Modern Optical Design[2] and page 3 of Lens Design Fundamentals[3]. These texts make clear that neither the spherical surface, nor the plano surface (a sphere of infinite radius) of the half ball lens 26 in *Blaingame* can reasonably be considered to be aspheric surfaces by one of ordinary skill in the art. For example, because there is a need for some reference surface, an asphere is usually defined by its departure from some reference sphere. This is expressed as the difference between the sphere and the asphere at different heights above the optic axis in Figure 6.23 on page 216 of the Elements of Modern Optical Design reference attached hereto.

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[1] The Wordsworth Dictionary of Science and Technology, page 54 (1995); *See also* The Photonics Dictionary (Laurin Publishing 1994 edition) ("**Aspheric Lens** – A lens element in which at least one face is shaped to a surface of revolution about the lens axis, including conic sections but excluding a sphere."); *see also* McGraw-Hill Dictionary of Scientific and Technical Terms (5th ed. 1994) ("**Aspheric surface** [optics] A lens or mirror surface which is altered slightly from a spherical surface in order to reduce aberrations."
[2] Donald O'Shea (John Wiley and Sons, 1985)
[3] Rudolf Kingslake (Academic Press 1978)

Rather, a half ball lens is a lens that is clearly defined as a spherical lens, that is "[a] lens whose surfaces form portions of spheres."[4] Thus, a half ball lens cannot reasonably be considered to be an aspherical lens by one of one of ordinary skill in the art. As such, the rejection of claims 1, 17, 18, 21-24, 26-28, and 32 is based on clear error and the Applicants respectfully request that the rejection be withdrawn prior to submission of the appeal brief.

Next, the Examiner rejects claims 17, 18, 25, and 33-40 under 35 U.S.C. 103(a) as being unpatentable over *Gaebe* (U.S. 5,684,901). In this rejection the Examiner has made unsupported allegations that the claimed lenses are known, have known benefits, and that replacing a laser with a photodetector would have been obvious without providing concrete evidence of motivation for the proposed combination as required by the Federal Circuit[5]. An unsupported allegation of motivation is not concrete evidence and until concrete evidence of motivation is submitted, the Applicant has no duty to submit evidence of nonobviousness. *See* MPEP 2142. Therefore, due to this clear error, the Applicants respectfully request that the rejection of claims 17, 18, 25, and 33-40 be withdrawn.

Finally, the Examiner rejects claims 21-24 and 32 under 35 U.S.C. 102(b) as being anticipated by *Gaebe*. Claim 21 includes 112-6 paragraph means-plus-function elements which require, among other things, the Patent Office to identify the corresponding structure support in the Applicant's specification, and to point to equivalent corresponding structure in the prior art. MPEP 2181-2183. The Examiner has failed to perform the required analysis. For example, the Examiner indicates that the Examiner is construing air as the optical medium on page 3 of the Office Action. The Applicant does not agree that air in the prior art is a structural equivalent to the corresponding structure of the optical medium disclosed in the Applicant's specification. Therefore, due to this clear error, the Applicants respectfully request that the rejection of claims 21-24 and 32 be withdrawn.

Dated this 16 day of February, 2007.

Respectfully submitted,

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[4] McGraw-Hill Dictionary of Scientific and Technical Terms (5th ed. 1994).
[5] *In re Zurko*, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001)

difference between the sphere and the asphere at different heights above the optic axis, as shown in Fig. 6.23. First the distance between the plane at the sphere vertex and the sphere is determined. This is referred to as the sagitta or "sag" of the surface at different distances from the optic axis. For a sphere the sag may be written as

$$z_s = \frac{c\rho^2}{1 + \sqrt{1 - c^2\rho^2}}, \tag{6.50}$$

where $c = 1/R$, the curvature of the surface, and $\rho = \sqrt{x^2 + y^2}$, the distance from the optic axis. If c^2 in the denominator of Eq. 6.50 is replaced by $(1 + \kappa)c^2$, the equation gives the sag for an asphere, which is a conic section of revolution, κ is the conic constant ($\kappa = 0$ for a sphere, $\kappa = -1$ for a parabola, $-1 < \kappa < 0$ for ellipsoid, and $\kappa < -1$ for a hyperbola). Depending on the conjugate distances and the presence of other elements in the system, different conic sections are used to construct systems with no spherical aberration. Additional corrections for off-axis aberrations can be made by introducing surfaces that can be represented as higher order polynomials of $c^2\rho^2$ (i.e., $(x^2 + y^2)/R^2$). The added degrees of freedom provided by allowing surfaces to be aspheric must be balanced against the difficulty and increased cost of producing such surfaces.

An example of an aspheric surface in an optical system is the Schmidt corrector plate used for systems with large light-gathering power, such as TV projection systems, missile tracking cameras, and wide-field telescopes. The plate has a fourth-power curve of the form $z_\alpha = \alpha\rho^2 + \beta\rho^4$.

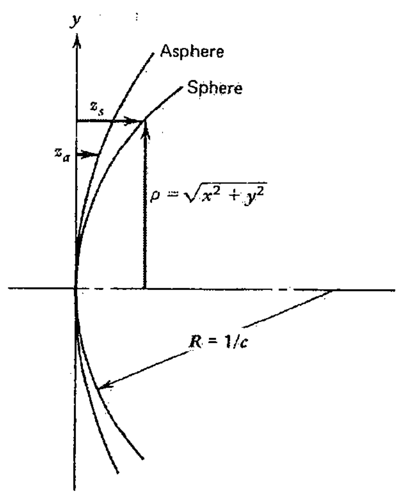

Figure 6.23. Aspheric surface. Definition of an asphere as a departure from a spherical surface.

single piece of glass having polished surfaces, and a complete lens thus contains one or more elements. Sometimes a group of elements, cemented or closely airspaced, is referred to as a "component" of a lens. However, these usages are not standardized and the reader must judge what is meant when these terms appear in a book or article.

I. RELATIONS BETWEEN DESIGNER AND FACTORY

The lens designer must establish good relations with the factory because, after all, the lenses that he designs must eventually be made. He should be familiar with the various manufacturing processes and work closely with the optical engineers. He must always bear in mind that lens elements cost money, and he should therefore use as few of them as possible if cost is a serious factor. Sometimes, of course, image quality is the most important consideration, in which case no limit is placed on the complexity or size of a lens. Far more often the designer is urged to economize by using fewer elements, flatter lens surfaces so that more lenses can be polished on a single block, lower-priced types of glass, and thicker lens elements since they are easier to hold by the rim in the various manufacturing operations.

A. Spherical versus Aspheric Surfaces

In almost all cases the designer is restricted to the use of spherical refracting or reflecting surfaces, regarding the plane as a sphere of infinite radius. The standard lens manufacturing processes[1] generate a spherical surface with great accuracy, but attempts to broaden the designer's freedom by permitting the use of nonspherical or "aspheric" surfaces lead to extremely difficult manufacturing problems; consequently such surfaces are used only when no other solution can be found. The aspheric plate in the Schmidt camera is a classic example. However, molded aspheric surfaces are very practical and can be used wherever the production rate is sufficiently high to justify the cost of the mold; this applies particularly to plastic lenses made by injection molding. Fairly accurate parabolic surfaces can be generated on glass by special machines.

In addition to the problem of generating and polishing a precise aspheric surface, there is the further matter of centering. Centered lenses with spherical surfaces have an optical axis that contains the centers of curvature of all the surfaces, but an aspheric surface has its own independent axis, which must be made to coincide with the axis containing all the other centers of

[1] F. Twyman, "Prism and Lens Making," Hilger and Watts, London, 1952. D. F. Horne, "Optical Production Technology," Crane Russak, New York, 1972.

curvature in the system. Most astronomical instruments and a few photographic lenses and eyepieces have been made with aspheric surfaces, but the designer is advised to avoid such surfaces if at all possible.

B. Establishment of Thicknesses

Negative lens elements should have a center thickness between 6 and 10% of the lens diameter, but the establishment of the thickness of a positive element requires much more consideration. The glass blank from which the lens is made must have an edge thickness of at least 1 mm to enable it to be held during the grinding and polishing operations (Fig. 1). At least 1 mm

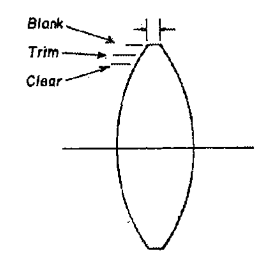

Fig. 1. Assigning thickness to a positive element.

will be removed in edging the lens to its trim diameter, and we must allow at least another 1 mm in radius for support in the mount. With these allowances in mind, and knowing the surface curvatures, the minimum acceptable center thickness of a positive lens can be determined. These specific limitations refer to a lens of average size, say $\frac{1}{2}$ to 3 in. in diameter; they may be somewhat reduced for small lenses, and they must be increased for large ones. A knife-edge lens is very hard to make and handle and it should be avoided wherever possible. A discussion of these matters with the glass-shop foreman can be very profitable.

As a general rule, weak lens surfaces are cheaper to make than strong surfaces because more lenses can be polished together on a block. However, if only a single lens is to be made, multiple blocks will not be used, and then a strong surface is no more expensive than a weak one.

A small point but one worth noting is that a lens that is nearly equiconvex is liable to be accidentally cemented or mounted back-to-front in assembly. If possible such a lens should be made exactly equiconvex by a trifling bending, any aberrations so introduced being taken up elsewhere in the system. Another point to notice is that a very small edge separation between two lenses is hard to achieve, and it is better either to let the lenses